

Expert Rebuttal Report of Joshua Lipton, PhD


ASARCO LLC Chapter 11 Bankruptcy

Case No. 05-21207

Coeur d'Alene Basin, Idaho

August 10, 2007

Prepared by:

A handwritten signature in black ink, consisting of a large, stylized 'J' followed by a series of loops and a long horizontal stroke extending to the right.

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A. Introduction

This rebuttal report addresses opinions contained in the reports of Zelikson and White (2007), prepared on behalf of Asarco, LLC, and Powell and Desvousges (2007), prepared on behalf of Asarco, Inc. In addition to my rebuttal comments, I have updated my calculations of natural resource damages to reflect the U.S. Environmental Protection Agency's (EPA's) proposed remedial actions for the Coeur d'Alene Basin (Grandinetti, 2007), to account for settlements with Asarco by the Coeur d'Alene Tribe and the State of Idaho, and to update damages to 2008\$. Section B of this report contains rebuttal opinions related to the report of Zelikson and White. Section C of this report contains my updated calculations of natural resource damages. Section D contains rebuttal opinions related to the report of Powell and Desvousges. Section E contains literature cited.

B. Rebuttal Opinions Related to Report of Zelikson and White (2007)

Zelikson and White (2007) prepared a report on behalf of Asarco, LLC. In that report, the authors present their recalculations of the natural resource damages assessed by the natural resource Trustees as presented in Lipton et al. (2004a) and in my expert report of June 15, 2007 (Lipton, 2007). Their recalculations yield total natural resource damages of \$45.1 million, with an Asarco cost share, after applying a \$4.78 million offset for prior settlements, equal to \$5.1 million. In performing their recalculations, the authors have misapplied a so-called cost-effectiveness criterion, have incorrectly discounted future costs without accounting for inflation in restoration costs, and improperly subtracted Ninemile Creek from their analysis without adjusting the Basin-wide Asarco

share of damages. These factors result in a substantial underestimate of damages. Below, I describe in greater detail my disagreements with the approaches to calculating damages used by Zelikson and White.

Misapplication of cost-effectiveness criterion

A central element of Zelikson and White's damage calculations is to revisit the Trustees' restoration project alternatives and to apply the least expensive alternative on the basis of "cost effectiveness." The authors use this approach to substantially reduce the Trustees' damage estimates for both aquatic resources and federal lands.

At page 60, the authors state that "once the alternatives have been scaled such that they become 'equivalent' [cost-effectiveness] should be, in our view, the requisite criteria." I agree that, *all other things being equal*, cost-effectiveness should be applied to select restoration alternatives. However, cost-effectiveness should only be applied when all other benefits of the restoration projects are *equivalent*. Moreover, cost-effectiveness is not determined by simply selecting the alternative with the lowest capital cost. Trustees may select "higher cost" alternatives under many different scenarios, such as when:

- ▶ The ecological or human use benefits of a "higher cost" project are greater
- ▶ The restoration to be achieved by the "higher cost" project represents a better nexus to the injury and therefore more fully restores the injured resource or service

- ▶ The likelihood of project success is greater for the “higher cost” project
- ▶ The longevity of the “higher cost” project is greater
- ▶ A mixture of projects is deemed more desirable than a single type of project (e.g., because of issues of nexus, likelihood of success, scale).

Thus, it is critical to understand that the least cost project may not be the most cost-effective, most ecologically appropriate, or most desirable project, and Trustees have the option to select higher cost projects.

Zelikson and White’s reliance on least cost as the overriding evaluation criterion is inconsistent with the authors’ footnote 269 at page 60. Footnote 269 lists six evaluation criteria, then states that “If the Trustees conclude that two or more alternatives are equally preferable based on these factors, the Trustees must select the most cost-effective alternative.” Zelikson and White ignore the requirement that the alternatives must be “equally preferable” and improperly select the least cost alternative in their analyses.

At page 62, the authors make this error in their proposed “re-scaling” of aquatic resource damages. They argue that because the cost per discounted service acre-year (DSAY) of restoration is lower for South Fork Coeur d’Alene restoration projects, this least cost alternative should be applied to all aquatic debit calculations. The Zelikson and White analysis is in error for two different reasons. First, restoration projects are required to provide for the restoration, rehabilitation, replacement,

and/or acquisition of the equivalent of the injured natural resources and the services those resources provide [43 CFR § 11.82(a)]. Projects associated with large stream restoration (woody debris addition) provide different ecological services than the road relocation projects that would benefit small/medium streams. Appropriate compensation for the Basin-wide aquatic resource injuries necessarily involves restoring both small/medium- and large-stream ecological services. The woody debris additions proposed for large rivers will not fully restore small/medium stream services, and I do not believe it is appropriate to use the restoration of large river habitats to compensate for injuries to small/medium streams.

Second, the \$/DSAY calculations presented by Zelikson and White have misinterpreted the Habitat Equivalency Analysis (HEA) methodology used in our expert reports. Consequently, the \$/DSAY values presented in Table 12 (p. 63) of Zelikson and White are incorrect. Our original calculations were all indexed to the baseline trout density for each individual stream reach. In order to calculate the benefits of the restoration projects and the \$/DSAY for the restoration projects, the projects must be normalized to the stream-specific trout baseline. Because they are stream-specific, DSAYs cannot be summed across locations.

Zelikson and White advance a similar argument to reduce damages to federal lands. The authors enumerate the different restoration alternatives for injured federal lands and state that “As designed, each of these components provides an alternative such that one of the five could be selected” (p. 67) and “Each of the four Stratus-defined alternatives provides full compensation for the injured resource” (p. 78). They then select the least expensive alternative identified by the Trustees, which

is a conservation easement with natural recovery. However, it is important to recognize that the potential alternatives are not ecologically equivalent, nor do they provide the same benefits. For example, a conservation easement with active revegetation projects and a conservation easement with natural recovery do not provide the same ecological benefits, do not have the same recovery curves, and do not have the same likelihood of success. It is critical that these factors be considered when selecting restoration projects. Zelikson and White selected the easement/natural recovery option in their analysis solely because it was the least cost alternative. However, we did not select this option as the preferred alternative because the benefits of the option are uncertain, and the true costs of acquisition and management could not be ascertained with confidence, as we stated in our reports.

Overall, Zelikson and White's use of least cost alternatives artificially reduces damages and would not result in full restoration of the injured resources.

Improper use of discounting

Zelikson and White argue that our damage estimates do not properly account for discounting. Their discussion of discounting focuses on the rate of return that the Trustees may be able to receive on any settlement funds before they are needed to implement restoration. It is correct that we did not incorporate a rate of return on settlement funds to be used in future implementation periods.

However, we also assumed no inflation in future restoration costs. We have revised our calculations (Section C, below) to incorporate both of these factors correctly.

Improper subtraction of Ninemile Creek from Asarco share

Zelikson and White subtract damages associated with injuries to natural resources in Ninemile Creek from their total. The authors then apply the 22% Asarco “share” that was assigned by the federal district court based on Basin-wide tailings production. Because that Basin-wide share was assigned with Ninemile Creek tailings included in the total volume of tailings, it is incorrect to subtract Ninemile Creek damages and *then* apply the 22% share. The two appropriate approaches to making this adjustment would be to apply the 22% share to total Basin-wide damages (including Ninemile Creek), or to subtract Ninemile Creek damages from the total and then apply a newly estimated (and substantially higher) share in which Asarco’s percentage contribution was recalculated from a total tailings production without the Ninemile Creek contribution. The effect of subtracting the Ninemile Creek damages and then applying the 22% share to the remainder is to substantially underestimate damages.

Specific comments

In addition to the major comments discussed above, I disagreed with a number of specific elements of the Zelikson and White discussion. I present these specific comments below.

- ▶ Table 8 (p. 58) states that “the ‘restoration’ component [of natural resource damages] may serve as a substitute (rather than an addition) to the HEA components derived in the Stratus reports.” This is incorrect. Implementation of restoration (or remediation) actions will reduce interim and residual damages. However, unless an equivalency element is introduced

to account for past, present, and future interim losses, those components of damages will not be included. The true measure of total damages is the cost of primary restoration to baseline conditions *plus* the cost of restoration needed to compensate for interim losses.

- ▶ At page 59, the authors correctly note that the analyses underlying the federal claim and presented in my expert report were in 2004\$ and need to be updated. In Section D of this report, I have updated all calculations to 2008\$, based on a projected consumer price index and construction cost index from Ammann (2007).
- ▶ Zelikson and White argue that the Coeur d'Alene Basin has been affected by a number of factors that influence baseline conditions and contend that “the assumption of baseline conditions is inappropriate and this has the direct effect of overstating injury” (p. 64). Zelikson and White’s contention is without basis, justification, or merit, and the authors do not express any specific opinions about how the baseline estimates used in our analyses should be adjusted. Our aquatic analyses relied on extensive field data from upstream sampling locations and reference sites to quantify baseline conditions, consistent with scientific practice and the DOI’s NRDA regulations.
- ▶ At pages 65-67, Zelikson and White argue against the Coeur d'Alene Tribe’s submerged timber claim. Without addressing the flaws of the authors’ analysis, I note that the submerged timber claim was made by the Coeur d'Alene Tribe only. As pointed out by Zelikson and White, the Coeur d'Alene Tribe has already settled their natural resource

damages claim. As a result, the submerged timber element is not included in my estimates of damages to the Coeur d'Alene Basin.

C. Revised Natural Resource Damage Calculations: Aquatic Resources and Federal Lands

This section presents revised calculations of natural resource damages for aquatic resources and federal lands. The revisions are limited to the HEA calculations presented in the original expert reports. Our revisions provide several updates. First, we have updated our calculations to 2008\$. We also correctly incorporate discounting to account for both the time value of money and escalations in restoration costs, as discussed above in Section B. These two revisions are used to update the damages presented in Lipton et al. (2004a) and Lipton (2007) that were based on the interim remedy described in the EPA's Record of Decision (U.S. EPA, 2002). We then present revised damage calculations to incorporate the influence of the comprehensive cleanup described in the expert report of Grandinetti (2007).

Updated natural resource damages assuming implementation of interim remedy

We revised our previous calculations of natural resource damages that assumed implementation of EPA's interim remedy as presented in the Record of Decision (U.S. EPA, 2002). The revised estimate is presented in 2008\$, and accounts for both expected price increases and anticipated rates of return on invested settlement funds during the period of restoration using values presented by Ammann (2007). This estimate, presented in Table 1, is based on the same analysis as that presented in 2004\$ in Lipton (2007) and in all other respects is identical.

Table 1. Total natural resource damages using the service replacement approach assuming implementation of the interim remedy (damages updated to 2008\$)

Resource	Damages in 2008\$
Aquatics ^a	\$68.4 million
Federal lands ^b	\$68.2 million
Swans	\$209.6 million
Savings through riparian restoration ^c	(\$8.2 million)
Prior settlements	(\$4.78 million)
Total	\$333.2 million

a. Based on road relocation alternative in Ninemile and Canyon creeks and large woody debris addition in the South Fork Coeur d'Alene River (SFCDR), 10-year implementation.

b. Based on road removal alternative.

c. Savings are achieved because of riparian benefits realized by implementation of aquatic replacement projects as described in Lipton et al. (2004b).

Updated natural resource damages assuming implementation of comprehensive remedy

In addition to updating our prior estimates to 2008\$, we also developed calculations of total natural resource damages assuming implementation of EPA's comprehensive cleanup approach, as presented in Grandinetti (2007). According to Grandinetti (2007) and URS Greiner and CH2M Hill (2001b), the comprehensive cleanup approach specifies remedial projects for Ninemile Creek, Canyon Creek, and the SFCDR over a 20-year period from 2008 to 2027. Because the extent and timing of conducting a comprehensive cleanup differs from the interim remedy presented in the Record of Decision (U.S. EPA, 2002), the magnitude and timing of natural resource damages will also differ. Damages are reduced by the ecological benefits of additional remediation, but increased by collateral natural resource injuries that will occur as a result of implementation of the remedy.

Damages in this section are presented in 2008\$ and account for both expected price increases and anticipated rates of return on invested settlement funds during the period of restoration (Ammann, 2007).

Injured aquatic resources

The comprehensive cleanup is intended to improve aquatic habitat and trout populations, mainly by reducing the concentrations of dissolved zinc in surface water. In Ninemile Creek, the comprehensive cleanup approach is expected to reduce zinc concentrations to approximately 15 times the aquatic life criterion (ALC) at the end of the remedial period (U.S. EPA, 2002). We assume that after 100 years, Ninemile Creek will sustain a Tier 3 fishery (Cami Grandinetti, U.S. EPA Project Manager for the Bunker Hill Superfund Site, personal communication, July 18, 2007) and therefore zinc concentrations will be approximately 7 times the ALC (Lipton et al., 2004c). Lacking more site-specific information, we assumed that the remedial actions described for Canyon Creek would achieve the same results as in Ninemile Creek. In the SFCDR, the comprehensive cleanup is expected to reduce zinc concentrations to 4.5 times the ALC at Pinehurst at the end of the remedial period and to 3.5 times the ALC after 100 years (Cami Grandinetti, U.S. EPA Project Manager for the Bunker Hill Superfund Site, personal communication, July 18, 2007).

Table 2 presents trout densities in Ninemile Creek, Canyon Creek, and SFCDR before the comprehensive remedial actions and in these streams in 20 years, following the remediation program, and in 100 years, based on the quantitative relationship between trout populations and

magnitude of the acute zinc ALC exceedence described in Lipton et al. (2004c, Figure 4.1). These predicted improvements in trout densities likely overestimate the benefits of the remedial actions (and therefore underestimate damages) because predicted zinc values are average concentrations rather than maximum concentrations that ultimately determine trout response.

Table 2. Recovery of trout services from EPA remedial actions

Reach	Area ^a (m ²) (acres)	Initial average density (fish/m ²)	Predicted density in 2027 ^b (fish/m ²)	Predicted density in 2107 ^c (fish/m ²)
Canyon Creek below Burke	82,268 (20.3)	0.000	0.005	0.019
Ninemile Creek below Interstate Mill	34,870 (8.6)	0.000	0.011	0.041
SFCDR below Canyon Creek	461,932 (114.1)	0.020	0.058	0.068

a. See Table 4.1 from Lipton et al. (2004c) for length and width data.

b. The predicted benchmark is 15× ALC for both Canyon and Ninemile creeks and 4.5× ALC for SFCDR.

c. The predicted benchmark is 7× ALC for both Canyon and Ninemile creeks and 3.5× ALC for SFCDR.

Table 3 presents a summary of service loss debits for Canyon Creek, Ninemile Creek, and the SFCDR using the HEA method described in Lipton et al. (2004c). For this calculation, improvements occur linearly from 2008 to 2027 and from 2028 to 2107.

Table 3. Information used in calculating service loss debits

Reach	Time segment	Start year	Stop year	Trout density at start of period (#/100 m ²)	Trout density at end of period (#/100 m ²)	Baseline density (#/100 m ²)	% baseline service at end of period	Reach area (acres)	DSAYs of debit ^{a,b}
<i>Canyon Creek — Oneil Gulch to mouth</i>									
	1	1981	2007	0.0	0.0	5.5	0%	20.3	852
	2	2008	2027	0.0	0.5	5.5	9%		298
	3	2028	2107	0.5	1.9	5.5	35%		289
Total									1,440
<i>Ninemile Creek — Interstate Mine to mouth</i>									
	1	1981	2007	0.0	0.0	12.2	0%	8.6	361
	2	2008	2027	0.0	1.1	12.2	9%		126
	3	2028	2107	1.1	4.2	12.2	35%		123
Total									610
<i>SFCDR — Canyon Creek mouth to North Fork</i>									
	1	1981	2007	2.0	2.0	11.8	17%	114.1	3,975
	2	2008	2027	2.0	5.8	11.8	49%		1,184
	3	2028	2107	5.8	6.8	11.8	58%		945
Total									6,105

a. All discounted HEA values calculated with a base year of 2008 and a 3.0% annual discount rate.

b. Totals may differ from sum of the segments as a result of rounding time segment values for presentation. DSAYs are stream-specific and cannot be summed across locations.

Table 4 summarizes the injuries and damages for aquatic resources calculated using the selected restoration project alternative for each habitat type and a 10-year implementation schedule. As previously discussed, Table 4 shows how the HEA credit for implementing these projects was adjusted to account for the different baseline trout density in each injured waterway. For Ninemile and Canyon creeks, the selected and cost-effective habitat enhancement project is road and rail bed relocation in a medium stream (\$16.0 million and \$15.1 million, respectively). For the SFCDR, the selected alternative involves addition of woody debris (\$33.0 million). Therefore, the total service replacement damages for injured aquatic resources associated with a comprehensive cleanup are approximately \$64 million.

Table 4. Summary of injuries and damages for aquatic resources

Basin	Total injured (acres)	Total HEA debit (DSAYs)	Habitat enhancement project	HEA credit per acre of restoration (DSAYs)^a	Restoration required (acres)^b	Cost per acre restored	Cost in millions of 2008\$
Canyon Creek	20.3	1,440	Road and rail bed relocation	55.2	26.1	\$614,110	\$16.0
Ninemile Creek	8.6	610	Road and rail bed relocation	24.9	24.5	\$614,110	\$15.1
SFCDR	114.1	6,105	Woody debris addition	25.7	237.5	\$138,803	\$33.0
Total^c					288.1		\$64.0

a. HEA credit per acre is adjusted for baseline habitat quality and therefore differs for each stream.

b. Calculated as total HEA debit (DSAYs) divided by DSAYs of HEA credit per acre of restoration.

c. Total may not equal sum of values shown because of rounding.

Federal lands

The comprehensive cleanup will remove contamination from all parcels of federal land in the upper basin that were not already cleaned up by EPA (Cami Grandinetti, U.S. EPA, personal communication, July 18, 2007). Of the 117.7 acres of injured habitat in Canyon Creek, Ninemile Creek, and the SFCDR presented in Lipton et al. (2004b), 87.1 acres will be remediated by the comprehensive cleanup, and 30.6 acres (at Smelterville Flats) were already remediated in 2000 (LeJeune et al., 2004; Lipton et al., 2004b). Lands that will be remediated provide no habitat services from 1981 to 2007, the year before implementation of the comprehensive cleanup, begin to provide services in 2008, and recover to full services after 40 years. Recovery of services at Smelterville Flats is identical to the trajectory presented by LeJeune et al. (2004).

As part of the comprehensive cleanup, EPA would construct an approximately 400-acre repository for contaminated soils at Cataldo/Mission Flats (Cami Grandinetti, U.S. EPA, personal communication, July 18, 2007). Construction of this repository will cause collateral injuries to terrestrial habitats. The repository will be opened in 2018 at the beginning of remedial work on the lateral lakes areas (Ammann, 2007; Grandinetti, 2007). While the repository is open, service loss is 100%; within 10 years of closure, service loss decreases to 50% because of vegetative plantings on top of the cover. Because the original vegetation will not recover in this area, no further recovery of services is expected. It is unlikely that the entire 400 acres would be disturbed at once; therefore we assumed that the repository would be constructed in phased cells of 100 acres each, and that each

cell would begin recovery following closure. We assumed that the time periods for the cells would overlap by two years to account for use of soil from a subsequent cell as cap material for the previous cell.

Table 5 summarizes the riparian habitat injury losses associated with the comprehensive cleanup approach.

Table 5. Inputs for HEA calculation of injuries to federal lands

Type of injured parcel	Injured acres by basin				Injury accrual start year	Habitat services in start year (and until increase)	Year service increase begins	Recovered level of habitat services	Year services recover ^a
	Lower Basin Coeur d'Alene River	SFCDR	Canyon Creek	Ninemile Creek					
Remediated under comprehensive cleanup	0	18.3	53.1	15.6	1981	0%	2008	100%	2047
Remediation completed	0	30.6	0	0	1981	0%	2001	100%	2040
Impoundment creation									
Phase 1	100	0	0	0	2018	0%	2027	50%	2036
Phase 2	100	0	0	0	2025	0%	2034	50%	2043
Phase 3	100	0	0	0	2032	0%	2041	50%	2050
Phase 4	100	0	0	0	2039	0%	2048	50%	2057

a. A linear increase in services from 0% to recovered level is used for the recovery of injured land.

Damages associated with these losses are calculated using road and railway bed removal, the most cost-effective of the feasible project alternatives, which provides 16.9 DSAYs of credit per acre of restoration. In 2008\$, the cost per acre for this type of replacement action is \$145,000, assuming a

1-year implementation. Table 6 presents the acres of road bed removal required to offset the injuries to federal lands, and the costs to conduct road bed removal for each basin. The total calculated damages for injuries to federal lands associated with the comprehensive cleanup are \$95.8 million.

Table 6. Summary of injuries and damages for federal lands

Basin	Total injured (acres)	Total HEA debit (DSAYs)	Road bed removal required (acres)^a	Cost in millions of 2008\$^b
Canyon Creek	53.1	2,965	175	\$25.4
Ninemile Creek	15.6	871	51	\$7.5
SFCDR	48.9	2,586	153	\$22.2
Lower Basin Coeur d'Alene River	400.0	4,746	281	\$40.7
Total			660	\$95.8

a. Calculated as total HEA debit (DSAYs) divided by 16.9 DSAYs of credit per acre of restoration.

b. Costs are calculated as the per-acre cost (\$145,000) multiplied by the number of acres of road bed removal necessary.

Savings through riparian restoration

Riparian habitat is created as a result of the 50.6 acres of road and railway relocation projects for injuries to aquatic habitat in Canyon and Ninemile creeks. Assuming a medium-size stream with an average width of 15 feet, 27.8 miles of stream would be restored. As a result of the aquatic habitat restoration on these 27.8 miles of stream, 101 acres of riparian habitat would be created (27.8 miles × 3.63 acres/mile) (Lipton et al., 2004b). Using the HEA credit calculation presented by Lipton et al. (2004b), each acre of riparian habitat created as part of an aquatic project reduces the acreage of riparian restoration needed by 0.87 acres. Therefore, the amount of riparian restoration needed is

reduced by 87.8 acres (101 acres \times 0.87). At a cost of \$145,000/acre, the cost savings from federal land replacement damages provided by implementation of aquatic replacement projects is \$12.7 million.

Damages associated with the comprehensive remedy

Table 7 summarizes the damage calculations for aquatic resources and federal lands associated with the comprehensive remedy. To determine total damages, damages to swans must be added to the values presented in Table 7.

Table 7. Total natural resource damages (2008\$) for aquatic resources and federal lands for the comprehensive remedy using the service replacement approach

Aquatics ^a	\$64.0 million
Federal lands ^b	\$95.8 million
Savings through riparian restoration ^c	(\$12.7 million)
Prior settlements	(\$4.78 million)
Total	\$142.32 million^d

a. Based on road and rail bed relocation alternative in Ninemile and Canyon creeks and wood addition in the SFCDR, 10-year implementation.

b. Based on road bed removal alternative.

c. Savings are achieved because of riparian benefits realized by implementation of aquatic replacement projects as described in Lipton et al. (2004b).

d. Does not include damages to tundra swans.

D. Expert Report of Powell and Desvousges

Powell and Desvousges (2007) present an analysis, on behalf of Asarco Inc., in which they estimate that natural resource damages for the site are \$16.8 million. Their analysis is based on the conclusion that:

- ▶ Site restoration costs, estimated by Ridolfi and Falter (2004) to be \$143.7–\$839.5 million, are zero.
- ▶ Aquatic resource damages, calculated by Lipton et al. (2004c) to be \$64.4–\$329.8 million, are zero.
- ▶ Federal lands damages, calculated by LeJeune et al. (2004) to be \$58.2 million, are \$3.6 million.
- ▶ Damages to tundra swans, calculated by Trost (2004) to be \$183.5 million, are \$13.2 million.

Overall, the conclusions presented by Powell and Desvousges are without basis or factual support, misrepresent both the Trustees' damage calculations and NRDA practices and regulations, and dramatically understate natural resource damages. I discuss the various elements of the authors' opinions below, organized according to the outline of the Powell and Desvousges report.

Summary of Conclusions: Natural Resource Damages (pp. 7-8 of 22)

The authors assert that the Trustees' natural resource damage calculations are "inconsistent with both the 43 CFR Part 11 regulations and basic economic principles" (p. 7 of 22). Without detailing the extensive administrative background and testimony associated with this case, which is the most comprehensive NRDA undertaken by the United States, the Trustees' approach to performing the assessment was entirely consistent with the DOI NRDA regulations at 43 CFR Part 11, as well as

with standard approaches for performing NRDAs throughout the United States. Powell and Desvousges provide no specific examples or evidence of such inconsistencies, and I disagree with their conclusion.

The authors suggest their analysis properly accounted for baseline conditions, assessed potential resource services losses, and selected the most cost-effective restoration (p. 7 of 22). Their report, however, provides no evidence whatsoever that they properly accounted for baseline conditions (other than simply stating that the Trustees did not), assessed potential resource service losses, or evaluated or selected restoration alternatives appropriately. Rather, their abbreviated and simplified analysis, which contains no data, supporting information, or quantitative analysis, is proposed as a preferred alternative to the more than 10 years of data collection, analysis, peer-reviewed publications, and detailed reporting that went into the Trustees' assessment of damages. Such a cursory examination of a complex site is without merit.

Powell and Desvousges (p. 7 of 22) also assert that the "Trustees' damages did not offer any cost-effective restoration for aquatic species." This statement is both groundless and curious. The Trustees' assessment of damages to aquatic resources (Lipton et al., 2004c) provides an extensive analysis of restoration alternatives for aquatic species and selects the most cost-effective approach that provides appropriate benefits given the injuries.

At page 8 of 22, Powell and Desvousges present a table that summarizes their opinions regarding the Trustees' assessment. The restoration plan provided by Ridolfi and Falter (2004), which sets

forth a plan to restore the injured resources of the Coeur d'Alene Basin, is dismissed because it “fails to consider restoration of services.” No basis for this contention is provided. The revised damage estimate presented by the authors, who apparently believe that no restoration is required or appropriate for one of the most catastrophically contaminated regions of the United States, is zero.

Powell and Desvousges also wholly dismiss all damages to the severely injured aquatic resources of the Basin, suggesting that the Trustees’ analysis “fails to consider baseline and fails to measure service losses properly” (p. 8 of 22). The analysis presented in Lipton et al. (2004c), as well as the supporting Report of Injury Assessment and Determination (LeJeune et al., 2000) and extensive trial testimony and expert reports, provide what may be the most detailed analysis of baseline and service quantification undertaken in the United States. A similar situation exists for the federal lands assessment undertaken by the Trustees; Powell and Desvousges again assert that the federal lands assessment “fails to account for baseline and overstates service losses,” without specifics, evidence, or basis.

Section 4.2.1. Overview of Basic NRD Principles (pp. 11-12 of 22)

In this section of their report, Powell and Desvousges contend that “NRDs are a residual concept – they address the potential residual injuries that may exist after the remedial actions have been completed” (p. 11 of 22). This analysis misrepresents and distorts NRDA as outlined in federal law, regulation, and precedent. Natural resource damages address both residual injuries (and damages) as well as past and ongoing damages (i.e., interim losses). The figure that accompanies their

statement (Figure 2, p. 12 of 22) emphasizes this error by presenting a flow chart in which a damage assessment is only “needed” if there is a residual injury after remedial cleanup. Again, this representation of the NRDA process is incorrect as a matter of law, regulation, policy, and precedent. Later, the authors contradict this “residual concept” of natural resource damages, stating that “Trustees also may recover natural resource damages for services lost between the passage of CERCLA in 1980 and the time that remediation has returned services to baseline levels.” It is not clear how the authors reconcile this statement with the aforementioned “residual concept” of natural resource damages. The Trustees’ analysis of natural resource damages at the Coeur d’Alene Basin considers both interim losses and residual damages.

Section 4.2.2. Damages Calculation for Aquatic Resources (p. 13 of 22)

Powell and Desvousges present a number of conclusions in this section that are without basis, incorrect, or misrepresent the Trustees’ assessment. The authors state that the Trustees’ assessment “does not consider the fundamental basis for NRDs, which is the reduction in natural resource services from baseline as a result of an injury.” The Trustees’ assessment was based on measured reductions in ecological services, including surface water/trout (for the aquatic resources assessment), riparian habitat services (for the federal lands assessment), and swans.

The authors then state that the Trustees’ assessment “does not focus on the total suite of services provided by the resource and the reduction from baseline that occurs as a result of the injury.” This statement also is incorrect. Our assessment quantified losses of services relative to baseline

conditions based on detailed field measurements. The authors go on to state that the Trustees' assessment "fails to provide any evidence that the baseline level of services is considered in this analysis." This statement is both incorrect and difficult to understand given the exceedingly detailed analysis of baseline conditions that was provided in LeJeune et al. (2000), the many expert reports that were submitted for trial, and the extensive trial testimony on the issues of baseline.

Finally, the authors assert that the Trustees' assessment "does not provide evidence that the combinations of suggested restoration alternatives are the most cost-effective for restoring services to baseline" and "consequently, the NRDs estimated in the LCL Assessment substantially overstate the value of the loss in natural resource services." As discussed above in my rebuttal comments to the report of Zelikson and White (2007), Powell and Desvousges err in suggesting that cost-effectiveness is the only criteria to be applied in selecting restoration alternatives and confuse cost-effectiveness with least cost. The restoration alternatives selected in our damage evaluation were found to be most appropriate and most cost-effective when all relevant factors were considered [see 43 CFR § 11.82 (d)].

Section 4.2.1.1 Acquisition of Clean Water (pp. 13-14 of 22)

Powell and Desvousges (2007) state that there is no basis for estimating damages based on the market price of resources. This is not true. The underlying foundation of the damage estimation as developed by DOI is on restoration, rehabilitation, replacement, and/or acquisition of the equivalent natural resources as those injured [43 CFR § 11.82(a)]. Market price analysis is an approach to

damage estimation based on the cost to acquire equivalent natural resources. In the Damage Determination phase – cost estimating and valuation methodologies (43 CFR §11.83), two damage estimation methodologies are available to assess damages based on the market price of natural resources and/or services: the unit methodology [43 CFR §11.83 (3)(b)(2)(ii)] and the market price methodology [43 CFR §11.83 (3)(c)(2)(i)].

The unit methodology derives an estimate based on the cost per unit of a particular item (water, in this case). The market price methodology may be used if the natural resources are traded in the market. In using this methodology, the authorized official should make a determination as to whether the market for the resources is reasonably competitive. While there may be debate as to the degree of competitiveness in the markets for any natural resource, water in this region of Idaho is both leased and sold through market transactions:

The holder of a water right in Idaho is considered to have established a real property right to that water, much like property rights for land. The constitution and statutes of the state of Idaho protect water rights as private property rights, and those rights can be bought and sold. Idaho has a thriving water market. Water rights can be transferred directly between individual buyers on a permanent basis.

Idaho Water Rights Fact Sheet, August 15, 2001; available:
<http://www.blm.gov/nstc/WaterLaws/idaho.html>

For the years between 1990 and 2003, the *Water Intelligence Monthly* and the *Water Strategist*, the leading trade journal on water market transaction in the Western United States, reported 63 water market transactions (leases and rights sales) totaling more than 2.9 million acre-feet of water in the

State of Idaho. These transactions are representative of the water market in the State of Idaho and provide a lower bound estimate of the value of water.

In his expert report, Shaw (2004, p. 1), an expert for the defendant mining companies, states that the water market prices presented in Lipton et al. (2004c) are likely an underestimate of the actual prices that would have to be paid to acquire such water:

The report understates the acquisition cost of the water under existing supply conditions and no consideration was given for the increase in water cost that would result from a water purchase of this magnitude. The actual acquisition cost of the water could easily be an order of magnitude larger than the estimated cost.

In our analysis we provided alternative estimates of damage based the annual lease price of water and purchase price of permanent water rights. In Idaho, leases for water dominate actual water right transactions both in the number of transactions and in the quantity of water exchanged.

Both the unit methodology and the market price methodology are methods available to the Trustees to estimate damages. Recovery of damages are then to be spent on the restoration, rehabilitation, replacement, and/or *acquisition of the equivalent natural resources*. This approach to estimate damages is an alternative approach to the restoration-based approach also presented in Lipton et al. (2004c).

Powell and Desvousges (p. 13 of 22) state that the estimate of damages must be based on the reduction in services provided by the resource. In fact, 43 CFR §11.71(a)(3) places equal preference on the measurement of resources or services. Only upon adherence to a set of restrictive

criteria presented in 43 CFR §11.71(f) should the Trustees use changes in service quantities, rather than resource quantities, as the measure of restoration or damage scaling. For the unit and market pricing methodologies, the Trustees determined that quantification of the resource itself, rather than the individual services, provided a better indication of the damage caused by the injury.

Powell and Desvousges (2007, p. 13 of 22) state that “assuming that an entire resource must be replaced assumes that the resource provides no services in its injured state.” This statement is a misunderstanding of the approach taken in Lipton et al. (2004c). Estimating the costs to acquire clean water to support in-stream biota is independent of the other additional uses the water may provide either upstream or downstream. It is not possible to purchase only that portion of the services of water that provide support to in-stream aquatic biota separate from all of the other services provided by water. While the aquatic resource values are separate and different from other uses of the water, to provide these services, the full resource must be provided. This point was detailed in defendant mining companies’ expert Mr. Shaw’s deposition [see Shaw (2005) deposition, p. 90, line 6 through page 92, line 13]:

Q. (Mr. Askman). I would like to go back to the orchard example that I was talking about earlier and talk a little bit about the orchard that you have. Do you know whether or not the water that you use to irrigate your orchard has any other beneficial uses upstream from your orchard?

A (Mr. Shaw). Yes.

Q. And does it?

A. Yes.

Q. What are those?

A. There is a fishery, there is white water rafting recreation, there's flat water recreation. There's no — there is one small hydro plant upstream.

Q. And downstream from you do you know if those uses still exist?

A. I don't think the white water exists, but there is a downstream fishery and downstream hydropower.

Q. And in your experience in dealing with water issues in the state of Idaho, is there a value associated with those uses?

A. There can be, yes.

Q. Okay. Now, if in the example that we were talking about earlier where the water that you were using to irrigate your orchard was contaminated, if that was contaminated, and you were seeking to acquire that same amount of water, do you know how much that would cost you per year?

A. Under your hypotheses, I don't.

Q. Okay. Well, let's — let's say that you could acquire that much from adjoining drainage, and it could be piped in for \$10,000 — just to pull a number out of the air. If that was the case, do you think it would be appropriate to subtract from that \$10,000 the values for all the remaining beneficial uses in the watershed where you were getting your water?

A. I'm not sure I follow your question.

Q. Okay. If you could acquire that much water for \$10,000, the amount of water that you use now to irrigate your orchard, but instead of being compensated that \$10,000 you were only offered \$4,000 because there are values associated with white water rafting, and a fishery, and other types of recreation on that water which — whose values were \$6,000, do you think that would be an appropriate way of compensating you for the loss of your water?

A. Not for my value of the water, no.

Q. Okay. So, in your opinion, would your value then be a unique value?

A. I don't know if it's a unique value, but it's a separate value for my interest.

Q. Okay. And that value would be different than the values which are placed on the other uses of the water; is that right?

A. Yes.

The fact that the cost of specific aquatic resource services cannot be estimated was one of the deciding factors on why we used the resource quantification, rather than individual service quantification, discussed above. The cost estimation presented in Lipton et al. (2004c) presumes that the other uses and services of the injured water will continue. The market prices on which we based our estimates incorporate the fact that other uses of the water upstream and downstream will still be available. Thus the residual resource and service values have been incorporated into our calculations.

Section 4.2.1.2 Replacement of Services (pp. 14-17 of 22)

At page 14 of 22, Powell and Desvousges assert that the Trustees' assessment "does not follow the guidelines set forth in 43 CFR 11. The regulations require that the LCL Assessment measure the reduction in services from baseline and the methods of restoration be cost-effective. Although some mention is made to the baseline issue in the LCL Assessment, there is no real evidence that these requirements have been fulfilled." As noted above, this assertion is entirely without merit. There is no basis to conclude that the assessment "does not follow the guidelines set forth in 43 CFR 11," and the authors provide no such examples. The discussion, analysis, and data collection supporting the Trustees' analysis of baseline are voluminous. The authors' assertion, without supporting evidence, that "there is no real evidence that these requirements have been fulfilled" is groundless

and represents a perplexing, though undefined, standard for fulfillment of “these requirements.”

The cursory and data-free discourse provided in the Powell and Desvousges report presents a stark contrast to the comprehensive evaluation and decade-long investigation undertaken by the Trustees.

At page 14 of 22, the authors question the conclusion that no fish were found in Canyon and Ninemile creeks, citing mining companies’ expert Dr. Tracy Hillman’s 2001 trial testimony that single-pass depletion electrofishing can underestimate trout populations and questioning the number of sample measurements. The authors fail to mention, or perhaps to recognize, that years of observations of these two grossly contaminated water bodies yielded no evidence of aquatic life, observations entirely consistent with the remarkably elevated concentrations of the hazardous metals zinc and cadmium. Further, local resource agencies have not sampled in these waters as often as in other locations because the degree of contamination renders the water so unfit for aquatic life that sampling has been deemed a waste of agency effort. No credible expert in fisheries biology or toxicology has questioned the conclusion that Ninemile and Canyon creeks were devoid of fish life for many decades. Finally, the authors refer to a comment expressed by Dr. Hillman regarding fishing effort. This matter was addressed and wholly discounted by the government’s fisheries expert, Dr. Frank Rahel, who showed that the electrofishing effort did not influence or bias population estimates.

At pages 15-17 of 22, the authors quote from the testimony of Dr. Hillman, suggesting that certain baseline factors were not considered by the Trustees. These opinions were addressed at great length in trial testimony, rebuttal reports, and deposition testimony. Dr. Hillman’s contention that fish

populations were reduced by impaired riparian vegetation rather than metals is flawed; the impairments to riparian vegetation were themselves caused by the metals contamination in riparian soils and sediments (which formed the basis of the Trustees' claim for federal lands). Without repeating each of the many issues that were deliberated at trial, the court found that fish were injured because of exposure to hazardous metals.

Powell and Desvousges protest, at page 17 of 22, that the Trustees' analysis of the relationship between zinc and trout populations was based on "only 15 data points" and that no standard error was provided for the equation. A total of 17 paired data "points" were used to develop the relationship shown in Figure 4.1 of Lipton et al. (2004c); another paired data point, from Ninemile Creek, was not included in the regression analysis because the zinc concentrations in Ninemile Creek were so elevated (and no fish were present) that it would have artificially skewed the statistical analysis. We presented both the regression model and the R^2 value of 0.89 in our figure. These are standard statistics to include in a scientific graph and report. Contrary to the authors' assertion that "the estimate in service losses is unreliable and does not provide a basis to estimate fish losses," our regression model provides a quantitative basis, using field data, to calculate the relationship between trout populations and zinc concentrations.

Section 4.2.2: Damages Calculations for Federal Lands (p. 17 of 22)

In this section of their report, Powell and Desvousges essentially repeat the same arguments made previously about the Trustees' aquatics assessment. The authors state, again without basis or

example, that “The LeJeune Assessment does not adhere to some of the basic economic principles that are the basis of the 43 CFR 11 regulations on NRDA. Specifically, the LeJeune Assessment does not account for baseline in its analysis” (p. 17 of 22). The referenced analysis utilized the same methods employed around the United States to calculate natural resource damages (including by Dr. Desvousges at the California Gulch site). The federal lands analysis also contained an extensive and detailed evaluation of baseline conditions. The authors go on to argue that the Trustees’ assessment “does not consider cost-effectiveness in the analysis of alternative restoration plans” (p. 17 of 22). As was discussed above in the context of the Zelikson and White rebuttal, the analysis considered cost-effectiveness, as well as other relevant criteria, to select the preferred restoration alternative.

Section 4.2.2.1: Habitat Loss Calculations (p. 18 of 22)

Powell and Desvousges argue that habitat services in the devegetated areas included in the federal lands assessment might provide some ecological services (the authors do not state what services they provide or the amount of those services) and therefore service loss cannot be 100%. As described in the various expert reports, testimony, declarations, and Report of Injury Assessment and Determination (LeJeune et al., 2000), the extent of habitat degradation at the devegetated riparian areas is so extreme that the area does not provide any ecological services, regardless of whether the habitat “may also play a geological function such as maintaining the stream channel.” This argument also is misleading because the restoration projects provide the same type of services as those lost in the injured riparian areas: ecological habitat services. Those projects do not, for

example, provide supplemental “geological functions.” Because the restoration projects are designed to restore those services that were lost, and were scaled accordingly, the argument posited by Powell and Desvousges has no merit.

The authors further state that the “LeJeune Assessment should be measuring the reduction in natural resource services from baseline not from a pristine environment” (p. 18 of 22). Powell and Desvousges are incorrect in suggesting that the federal lands analysis used a “pristine environment” as baseline. Baseline conditions were assessed from nearby reference streams and from upstream conditions; these conditions were not pristine and are subject to a number of human land uses.

Finally, the authors maintain that the “LeJeune Assessment does not correctly consider natural resource services when developing a timeline for recovery of the resource under remediation.” This contention also is false; the assessment includes a continuous recovery rate based on development of riparian vegetation. Stabilization of riverbanks, as suggested by the authors, is not the sole metric of resource recovery, and the recovery curve adopted by the Trustees is not based “on the lifecycle of one species of vegetation.” Rather, cottonwood growth is used to calculate the total 40-year duration of recovery. If the recovery were based solely on cottonwoods, the recovery curves would not be linear at all, since cottonwood establishment and succession is slow.

Section 4.2.2.2: Benefits Calculations (pp. 18-19 of 22)

Powell and Desvousges argue that the benefits of conservation easements should occur immediately. Although conservation easements were not selected as the appropriate or desirable

alternative (as discussed above in the rebuttal to Zelikson and White), the authors are incorrect that the benefits of conservation easements should occur immediately unless those easements will result in immediate net improvement to extant habitat (for example, if there is an immediate threat of development or other land use that impairs ecological services). This is not the situation in the Coeur d'Alene Basin.

Finally, the authors adopt the easement cost of \$3.6 million as the basis of damages. As discussed in our various reports, the \$3.6 million value was only a partial cost and did not include the actual costs of acquisition and management programs. Therefore, this cost cannot be used as the basis for damages. Moreover, the easement with natural recovery option is not expected to provide appropriate compensatory ecological benefits. Consequently, the easement/planting alternative was developed. We determined that this alternative was not cost-effective relative to the road relocation alternative. Therefore, the Trustees concluded that neither of the easement restoration alternatives would be selected to scale natural resource damages.

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